

Differentiation and apoptosis of mitochondria-rich cells in gills of Mozambique tilapia

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We examined cellular differentiation and apoptosis in mitochondria-rich (MR) cells in the gills of Mozambique tilapia acclimated to freshwater (FW) and those transferred to 70%-diluted seawater (70% SW), using BrdU technique and TUNEL staining, respectively. The TUNEL staining showed that the number of apoptotic MR cells was significantly increased at 1 day after transfer from FW to 70% SW. Thereafter, the number was decreased to the initial level at day 7. To further examine MR cell differentiation in the gills, FW-acclimated tilapia were injected with BrdU and then transferred to 70% SW. Newly-differentiated MR cells were identified by means of double immunofluorescence staining for BrdU and Na/K-ATPase, and classified into three subtypes: a single MR cell with a BrdU-labeled nucleus; a multicellular complex of MR cells with BrdU-labeled accessory cells; and a multicellular complex containing one or more BrdU-labeled MR cells. Whereas most BrdU-labeled MR cells were single MR cells in FW fish, three subtypes of BrdU-labeled MR cells were detected in fish transferred to 70% SW. Our findings suggest that transfer from hypotonic to hypertonic water enhances turnover of MR cells, and that the differentiation process of MR cells is different between FW and SW fish.